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THE VASCULAR PLANTS FROM SAN NICOLAS ISLAND, CALIFORNIA

ВY

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INTRODUCTION

So that the special botanical problems of each region can be properly emphasized and treated, it has appeared best to present the formal report on the vascular plants of the Templeton Crocker Expedition of the California Academy of Sciences, 1932, in several papers, each dealing with the collections from a relatively limited, definite geographic area. The first of these deals with the small collection from San Nicolas Island, California, both the first and last place visited for scientific studies by the Templeton Crocker Expedition.

San Nicolas Island lies nearly 70 miles west-southwest of San Pedro on the mainland of California, and is in the southern group of the Santa Barbara Islands. It is adjacent to the islet of Santa Barbara and to the larger islands of Santa Catalina and San Clemente. San Nicolas Island is a small island, about 10 miles long, a third as wide, and from 500 to 800 feet high along the mesa-like top. Although it lacks the interesting and varied vegetation of its larger neighbors, it is, nevertheless, the classic locality for a number of insular species, some of which are known in no other place. Most of these were described by Alice Eastwood in the only account of the flora of the island that has been published (Proc. Calif. Acad. Sci.,

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ser. 3, Botany, 1: 89-120, 1898). Miss Eastwood's report was based on the collection of 1897 of Mrs. Blanche Trask, intrepid and ingenious explorer of the southern members of the Santa Barbara Islands, where several rare endemic plants are named in her honor.

The following account, taken from the botanical notebooks of the expedition, briefly describes the features and floral aspect of San Nicolas Island:

March 12, 1932. "We arrived off San Nicolas Island about 3 P. M. The north end presented an uninviting expanse of barren sand-dunes. Midway down the island, patches of green could be seen on steep slopes between the beach and the summit of the island. The slopes were scoured and cut by gullies and arroyos. From the east, the island appeared like a mesa, its top being uniform and nearly flat. About 4 P. M., I landed at the south end where I collected on the lower slopes of the island. Lycium was the characteristic shrubby plant, and, although it was not uncommon, at no place did it form a thicket extensive enough to impede one's progress. Two species of Opuntia were also present but were not abundant. A shrubby Artemisia and Coreopsis gigantea were rare in the arroyos. Between these shrubby plants on flats and gentle slopes was herbaceous vegetation, many of the species being introduced weeds."

March 13, 1932. "Shortly after day-break, I landed and climbed to the top of the island which was buried in a heavy fog. The top of the island is an undulating plain, the edges of which are being dissected by raw-walled gullies. Only low herbaceous vegetation was seen on the plain, and grazing on it were numerous sheep. On the south wall of a canyon, I found three hepatics: Asterella, Targionia, and Sphaerocarpus. I looked for Riccia but found none. Below the top of the mesa, the gullies and ravines give rise to bad lands. Here there is little or no vegetation to cover the eroding slopes. Still lower down is a terrace, probably an elevated beach, on which I collected last evening. The vegetation there was the most luxuriant seen on the island and there were the thickets of Lycium and cacti. . . . This afternoon we sailed between Santa Catalina and San Clemente islands; and just before sunset, we could see Santiago Peak in the Santa Ana Range on the mainland, the characteristic saddle-back summit marking it."

On the homeward journey, the expedition again visited San Nicolas Island for two and a half days, August 26 to 28. The time was spent dredging, and, because of the heavy surf, no party was landed.

The present collection of vascular plants from San Nicolas Island consists of 34 numbers representing 32 species and varieties, 7 of which were not reported in Miss Eastwood's list. In that account, 82 species and varieties were listed, so that the present list brings the number of plants known from San Nicolas Island to 89.

LIST OF SPECIES

1. Bromus carinatus H. & A., Bot. Beechy Voy. 403 (1841)

The determinations of this and the two other grasses found on San Nicolas Island have been checked at the Grass Herbarium of the United States Department of Agriculture through the kindness of Dr. A. S. Hitchcock. The present number is probably B. Hookerianus or B. virens of Miss Eastwood's list. No. 8226.

2. Festuca octoflora subsp. hirtella Piper, Contrib. U. S. Nat. Herb. 10: 12 (1906)

This plant, not included in Miss Eastwood's list, may be a more recent introduction from the mainland where it is widespread and rather common. No. 8222.

3. Hordeum murinum L., Sp. Pl. 85 (1753)

Although this weedy foxtail was noted as "not common," two collections of it were made. No. 8211, 8218.

4. Brodiaea capitata Benth., Pl. Hartw. 339 (1857)

This grew among protecting thickets of *Opuntia* and *Lycium*. The flowers were pale lavender-rose. No. 8225.

- Parietaria floridana Nutt., Gen. Am. 2: 208 (1818)
 From a thicket of Lycium. No. 8228.
- 6. Atriplex californica Moq. in DC., Prodr. 13, pt. 2: 98 (1849) Clay slopes and flats. No. 8209.
 - 7. Abronia maritima Nutt. in Wats., Bot. Calif. 2: 4 (1880)

Sand-dunes just back of the beach. No. 8230. The rarer A. alba Eastw., with type locality San Nicolas Island, was not found.

8. Lepidium nitidum Nutt. in T. & G., Fl. 1: 116 (1838)
No. 8208A.

9. Lepidium Robinsonii Thell., Gatt. Lepidium 255 (1906)

This species, reported by Miss Eastwood as L. bipinnatifidum Desv., was common in open level places on the lower part of the island. No. 8208.

10. Tillaea erecta H. & A., Bot. Beechy Voy. 24 (1841)

This low herb, which was not reported in Miss Eastwood's list, was common on clay flats at the south end of the island. No. 8214.

11. Jepsonia sp.

Specimens belonging to a species of this interesting genus were found on northern clay slopes near the south end of the island. The plants were in leaf and no flowers or fruits could be found. The leaves are orbicular and about 2 cm. in diameter. Thus it appears that the plants are nearer to J. Parryi (Torr.) Small (Bull. Torr. Club 23: 18, ——1896) than to J. malvaefolia (Greene) Small (loc. cit., 19), a closely related species which is found on Santa Cruz and Santa Rosa islands to the northward. In the latter species, the leaves are described as being longer than wide and ovate-orbicular. Jepsonia has not been reported heretofore from San Nicolas Island. No. 8210.

12. Medicago hispida Gaertn., Fruct. 2: 349 (1791)

A common weed on clay flats. No. 8215.

13. Trifolium stenophyllum Nutt., Journ. Phil. Acad., n. ser., 1: 151 (1848)

The plant on San Nicolas Island is referable to *T. depauperatum* Desv. var. stenophyllum (Nutt.) McDerm. f. franciscanum (Greene) McDerm. according to Miss McDermott's North American Trifoliums (p. 140). It would seem better to treat this variable group as Jepson has and consider the island plant a broad-leaved form of *T. amplectens* T. & G. var. stenophyllum (Nutt.) Jepson (Man. Fl. Pl. Calif. 537). The plant was common on the mesa. No. 8212.

14. **Erodium cicutarium** L'Her. in Ait., Hort. Kew., ed. 1, 2: 414 (1789)

In Miss Eastwood's list, this weedy species was reported as uncommon. It is now abundant in areas visited near the south end of the island. No. 8217.

15. Erodium moschatum L'Her. in Ait., Hort. Kew., ed. 1, 2: 414 (1789)

This plant, although not uncommon, was less abundant than the preceding. It was not listed by Miss Eastwood. No. 8216.

Opuntia occidentalis Engel. & Bigel., Pacif. R. R. Rep. 4: 38 (1856); Proc. Amer. Acad. 3: 29 (1856)

Forming low thickets about a meter tall on the lower slopes of the island. Two collections were prepared to show variation, No. 8204A and 8205A. In the first, the joints are elongate-obovate and yellow-green, the areoles bear 4 or more spines, and the fruits are sterile. In the second, the joints are rather broadly obovate and glaucousgreen or bluish-green, the areoles bear 1-3 or occasionally 4 spines, and the fruits are fertile. This sort of variation is characteristic of the species as it occurs on the coast of Southern California. The plant was reported as "probably O. Engelmanni Salm. var. littoralis Engelm." by Miss Eastwood who had only a single flower without an ovary for study. According to Britton and Rose in The Cactaceae, the dull brownish spines of the present collections mark them as nearer to O. occidentalis than to O. littoralis (Engelm.) Cockerell.

17. Opuntia prolifera Engelm., Amer. Journ. Sci., ser. 2, 14: 338 (1852)

This Opuntia was not as common as O. occidentalis. It was about a meter tall. No. 8206.

- 18. Apiastrum angustifolium Nutt. in T. & G., Fl. 1: 644 (1840) No. 8227.
 - 19. Lomatium insulare (Eastw.) Munz, Man. S. Calif. Bot. 358 (1935)

Euryptera insularis (Eastw.) C. & R., Contrib. U. S. Nat. Herb. 7: 243 (1900).

Peucedanum insulare Eastw., Proc. Calif. Acad. Sci., ser. 3, Botany, 1: 106 (1898). This endemic species was rather common on the steep clay sides of arroyos just back of the beach. The leaves are somewhat glaucous and are variously cleft, the final segments sometimes being coarse and broad, sometimes finely divided and narrow. The flowers are bright yellow. No. 8207.

20. Sanicula arguta Greene in C. & R., Contrib. U. S. Nat. Herb. 7: 36 (1900)

This is S. Menziesii of Miss Eastwood's list. The plant was common around thickets of Opuntia and Lycium and on moist slopes in partially shaded places. No. 8201A.

21. Nemophila insularis Eastwood, spec. nov.

Nana, prostrata, basi divaricati ramosa, ramis gracilibus, subglabratis; foliis 2-3 cm. longis, 5-7 pinnatifidis, segmentis rotundis, plerumque oppositis, 3-4 mm. diametro, laeviter hirsutis et minute pustulatis, petiolis aequilongis laminis, divaricati-hirsutis; pedunculis subaequalibus petiolis, gracilibus, appresse hispidis; calycis segmentis subovatis, hispidis, auriculis minoribus; corolla caerulea, campanulata, circa 4 mm. longa, segmentis obtusis, ciliatis, inter staminibus prope basi minute atro-maculata et duobus, parallelis, hirsutis lineis; staminibus corolla brevioribus; capsula orbiculata, 3 mm. diametro, hispida, stylo bilobato, persistenti

Type: Herb. Calif. Acad. Sci. No. 206984, collected on March 13, 1932, on moist northern slopes of San Nicolas Island, California,

by John Thomas Howell, No. 8213.

This belongs to the group of small-flowered species of Nemophila described and figured by the author in Bull. Torr. Bot. Club 28: 137-160. The base of the corolla with the two rows of parallel hairs resembles Fig. 1a in Pl. 15, and the corolla is similar in shape to Fig. 6a on the same plate. The little black dots between the filaments above the base are unusual in these small-flowered species.

Nemophila insularis is a low annual reclining on the ground with spreading stems and begins to flower and fruit soon after springing from the ground, often while the round cotyledons are still present. The leaves have from 5 to 7 round divisions, generally opposite and decurrent along the rhachis, and each is tipped with a weak mucro. The petiole, which is about as long as the blade, is pubescent with spreading hairs and the lobes are clothed with appressed hairs minutely pustulate at base. The slender peduncles are generally as long as the adjacent petioles, spreading and recurving in fruit. The little flowers are pale blue, with calyx about 1.5 mm. long, corolla bell-shaped, 4 mm. long, somewhat hairy externally, and ciliate on the margins of the rounded lobes. Within the corolla above the base and between each pair of filaments are two parallel lines of hairs and a small black dot. The seed-pod is orbicular and generally contains 4 orbicular, minutely papillose seeds, each with a stout calvptra resembling a little handle.

22. Cryptantha Traskae Johnston, Contrib. Gray Herb., n. ser., 74: 77 (1925)

At the south end of San Nicolas Island, this local endemic was not common. It was reported by Miss Eastwood as C. Torreyana. No. 8223.

23. Lycium californicum Nutt. in Gray, Bot. Calif. 1: 542 (1876)

This was the commonest woody species at the southern end of San Nicolas Island and formed broad low thickets 6 dm. tall and 5 m. or less across. The leaves were fleshy but distinctly flattened; the corollas were sordid-white with dashes of brownish-purple in the throat below the lobes. No. 8203A.

24. Galium Aparine L., Sp. Pl. 108 (1753)

A widespread weedy species not reported heretofore from San Nicolas Island. No. 8224.

25. Marah major Dunn, Kew Bull. 151 (1913)

This plant is not listed by Miss Eastwood but Dunn (loc. cit., 152) cites specimens of it from San Nicolas, Santa Catalina, and San Clemente islands. No. 8231.

26. Achillea Millefolium var. lanulosa (Nutt.) Piper, Fl. Palouse Reg. 196 (1901)

No. 8231A.

27. Artemisia californica Less. var. insularis (Rydb.) Munz, Man. S. Calif. Bot. 575 (1935)

Crossostephium insulare Rydb., N. A. Fl. 34: 244 (1916).

A rare shrub in the arroyos, worthy of varietal recognition because of the leaves which are so different from those of typical A. californica. Miss Eastwood had only sterile shoots and wrote: "if an Artemisia, it is probably undescribed." Hall and Clements in their monograph of the North American species of Artemisia discuss this interesting insular plant as minor variation number 7 under A. californica (Carn. Inst. Wash. Publ. No. 326: 54, —1923). Besides San Nicolas Island, it is known only from San Clemente Island, the type locality. No. 8219.

28. Baeria Palmeri var. clementina Gray, Syn. Fl. 1, pt. 2, ed. 2: 452 (1886)

Found in open grassy places and about protecting shrubs. By Hall, it is called *B. chrysostoma* var. gracilis f. clementina in Univ. Calif. Publ. Bot. 3: 171 (1907) and simply *B. chrysostoma* F. & M. in N. A. Fl. 34: 77 (1914).

29. Coreopsis gigantea (Kell.) Hall, Univ. Calif. Publ. Bot. 3: 142 (1907)

Leptosyne gigantea Kell., Proc. Calif. Acad. Sci. 4: 198 (1873).

A single robust specimen of this was seen in an arroyo back from the beach. It was nearly 2 m. tall with a crown about as broad which carried hundreds of vellow heads. No. 8220.

- 30. Malacothrix implicata Eastw., Proc. Calif. Acad. Sci., ser. 3, Botany, 1: 113 (1898)
- M. saxatilis (Nutt.) T. & G. var. implicata (Eastw.) Hall, Univ. Calif. Publ. Bot. 3: 269 (1907).

Sterile specimens of this plant, first described from San Nicolas Island, were obtained from clay bluffs of an arroyo. No. 8228A.

- 31. Sonchus asper (L.) Hill, Herb. Brit. 1: 47 (1769) Only a single plant of this weed was found. No. 8221.
- 32. Sonchus oleraceus L., Sp. Pl. 794 (1753) No. 8229.